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TO: Al Lambacher, RMI Environmental Services Inc, (RMIES)
Eric Marsh, RMIES
FROM: Todd Struttman, Sharp & Associates, Inc. (SHARP)
Steven Roach, SHARP
SUBJECT: Review of Site Groundwater Investigation Laboratory Data
RMI Facility in Ashtabula, Ohio
DATE: May 12, 2003 (Revised *May 21, 2003*)

There have been a number of discussions on the qualified data collected as part of the Groundwater Remedial Investigation at the RMI facility. RMIES contracted with the outside laboratory, General Engineering Laboratories (GEL) for analysis of radionuclides (U and Tc-99) as well as Volatile Organic Compounds (VOCs). SHARP's role was to provide an independent review of the analytical data. SHARP began discussions with Don Sebest (of RMIES) in January, when the first sets of data were received, regarding certain concerns on data analysis and hold times that would require qualification or rejection of much of the data collected during the investigation. Don has been working with GEL to resolve the analysis protocol and hold time concerns.

SHARP, RMIES and GEL had a conference call on May 2, 2003, to discuss the interpretation of hold times and the revised Encore preservation methods, and confirmed that GEL's Standard Operating Procedures (SOP) are the same as the interpretation expressed by SHARP and RMIES. On May 9, 2003, GEL provided a draft written response to the questions raised. The response did not change the interpretation of hold times and does not provide sufficient documentation to change the data qualifications. Table 1 provides a split of accepted vs. rejected samples.

Table 1. Summary of Off-site Laboratory Analyses

Analysis	Number of Analyses	Number Accepted/ Qualified	Number rejected
Uranium (soil)	123	123	0
Tc-99 (soil)	123	123	0
VOCs (soil)	108	68	40 (37%)
VOCs (water)	14	14	0
Total	368 (100%)	328 (90%)	40 (10%)

Table 1 shows that 37% of the soils analyzed for VOCs were rejected. This rejection is due to GEL missing hold times for a large number of the samples. Table 2, below, provides further breakdown of the soils analyzed for VOCs. There were three shipments of samples that did not arrive at the laboratory in a timely manner: one set due to a snowstorm which delayed Federal

Express (Memphis airport was shutdown); one was misplaced by Federal Express; and one not received for Saturday delivery.

Table 2. Breakdown of Soil VOC Analyses

Description	Total	Rejected	Qualified	Accepted
VOC sample - Shipping delay at Fed Ex (a)	27	21	6	0
VOC Samples received at lab in timely manner (b)	81	19	23	39
Total	108 (100%)	40 (37%)	29 (27%)	39 (36%)

(a) There were three shipments that went through Federal Express that did not allow the laboratory sufficient time to analyze the samples (1 shipment arrived after the hold time expired, 4 days, and two shipments did not leave sufficient time for preparation and analysis (3 days)).

(b) These shipments were received at the laboratory within 2 days of collection.

Rejection of 37% of the VOC analyses for the soil samples is not an acceptable failure rate for a typical laboratory. Even if one considers the 81 samples delivered on time, 17 rejected represent a 21% rejection rate. The next step is to determine the effect of these data rejections on the conclusions that can be made in the Groundwater Remedial Investigation report.

Cc: D. Sebest, RMIES



Environmental Engineers,
Scientists, & Contractors

May 20, 2003

To: Steven Roach
From: Sara Crenshaw

Subject: Data Review Report for the RMI Extrusion Plant SI, Sampled December 2002 through January 2003.

The data review followed quality assurance procedures outlined in the U.S. Environmental Protection Agency (USEPA) documents *Test Methods for Solid and Hazardous Waste - Third Edition - Update III (SW-846)* and the other U.S. EPA methods used in these analyses.

1.0 GENERAL COMMENTS

General Engineering Laboratories in Charleston, SC performed all the analyses for the samples in the sample delivery groups. Samples were analyzed for Volatile Organic Compounds (VOCs), by SW-5035/8260B, and Technitium-99 and Total Uranium by DOE EML HASL Methods RAD A-005 and RAD A-013. The data reports received from RMI Environmental Services (RMI) contained the sample results with a quality control summary containing: method blanks, laboratory control samples/laboratory control sample duplicate (LCS/LCSD), matrix spike/matrix spike duplicates (MS/MSD), laboratory duplicates, volatile hold blanks for VOCs, and surrogate recoveries for VOCs.

The review of these data, while not a full validation was based on a technical review of the essential elements that could be determined from the summary data packages. The data were reviewed in accordance of the quality control requirement given in the methodology used. The items which were reviewed are as follows:

- Completeness
- Chain of Custody Records (COC)
- Holding Times
- Blank Contamination
- Laboratory Control Samples
- Matrix Spike/Matrix Spike Duplicate
- Surrogate Recoveries for VOCs

The quality control data for some Technitium-99 and Total Uranium analyses did not correlate with spike recoveries and relative percent differences for duplicate analyses could not be reproduced by the reviewer based on the reports submitted. Because of this, these data could not be evaluated based on the information contained in the laboratory data reports.

The dates used to calculate and evaluate holding times for the soil VOC samples is as follows. The date of collection was noted on the Chain of Custody records. The logbook entries for date preserved (placed in water and frozen) was supplied by the laboratory at the request of the reviewer. The date the sample was removed from the freezer was the "date prepared" listed on the laboratory sample report form. The date of analysis is also listed on the laboratory sample report form.

The following review criteria were used in assessing the VOC sample results. The method required that not more than 48 hours elapse from sample collection to sample analysis. (The sample must be placed in water and frozen within 48 hours of the collection date.) The hold time can then be "suspended" for up to 14 days while the sample remains frozen, however, once removed from the freezer, the sample must be analyzed within the time remaining to reach the total of a 48 hour hold time. If the sample is placed in water and frozen between 48 hours and 96 hours and analyzed upon removal from the freezer, the sample results are qualified as estimated (J). If the samples are collected, placed in water, frozen, removed from the freezer and analyzed within a the total time (minus the time frozen) of greater than 96 hours (greater than two times the holding time criteria), the sample results are qualified as unusable (R).

Of the 108 soil samples collected for VOC analyses, 40 (37%) were qualified as unusable (R) and 29 (27%) of the soil VOC samples were qualified as estimated (J) due to evaluation based on the holding time criteria listed above. Twenty-seven of the affected samples were in three shipments that were late on the arrival time at the laboratory due to weather and Federal Express delays. This affected samples were collected on December 12 and 13, 2002. Of these 27 samples 21 were qualified as unusable (R) and 6 were qualified as estimated (J).

These violations of holding time criteria far over shadowed any other quality control deficiency in the reviewer's consideration of laboratory quality control criteria. The hold time exceedences yield a low reliability of the quantitation data. For compounds that are reported as non-detect, the presence or absence of the compound cannot be determined. For the compounds with detected concentrations, the concentration reported is very highly in question due to the nature of volatile compounds preservation method selected by the laboratory. There is no way of determining the impact the hold-time exceedences have on the data for the detected parameters. Because the compounds were held for so long without preservation and not in a sealed container, it is hard to know how much cross-contamination from the storage with other samples or from laboratory contaminants may be present. If these data are used, they should be considered to be of screening quality and should not used for closure verification or for use in risk assessment.

Thirty eight percent of the soil boring VOC data were collected and analyzed within the hold time criterion (48 hours from collection to analysis). Groundwater data for VOCs were collected and analyzed within the holding time criterion. Some compounds were qualified as estimated due to laboratory or field blank contamination. These data were considered to be reliable and can be used without additional qualification.

A quick reference for the samples VOC data rejected or qualified can be found in Table 1: Overview of Samples Collected in the RMI Groundwater Report.

The following sections detail the validation notes for each of the analyses in these data sets. Any actions (i.e., qualification or rejection of data) required based on the data review are highlighted in bold within the section detailing the Quality Assurance/Quality Control (QA/QC) exceedance. Any necessary data qualifiers have also been added to the data summary pages found in RMI Phase II Groundwater Investigation Report for the RMI Extrusion Plant Site, Appendix H, hereafter referred to the RMI Groundwater Report.

2.0 Completeness

The data were reported for all samples listed on the chain of custody records submitted between December 5, 2002 and January 31, 2003. The electronic data files submitted with the samples did not contain data for the following water samples:

<u>Sample ID</u>	<u>Date Collected</u>	<u>Lab ID</u>
Trip Blank	12/12/2002	S21212201
Equipment Blank	12/11/2002	S21211202
Equipment Blank (PUMP)	12/13/2002	S21212239
Trip Blank	12/13/2002	S21213201
Sample Pump	12/13/2002	S21213202

3.0 Chain of Custody (COC)

The COC records indicated that three samples from differing depth intervals were collected from the soil boring at location BH4C on 2/16/02, however, these samples were actually collected from soil boring at location BH5C (per Kevin Smith, SHARP field geologist on site during collection). These sample identifications have been corrected in the project database and hand corrected in the hard copy deliverables. No further actions are required, as this did not impact the quality of the data.

4.0 Holding Time

4.1 VOCs

Many of the VOC results for soil analyses were qualified as unusable (R) due to the exceedance of holding time criteria given in the method for samples collected for VOCs using ENCORE® samplers. According to the Method 5035 from SW-846 samples collected using the ENCORE® samplers should be placed in an acid solution preservative within 48 hours of collection. The sample can then be held at 4°C for up to 14 days prior to analysis. However, the laboratory placed the sample in water and froze the extract until analysis. Extracting with water and freezing the samples is an option mentioned in Update 4 to SW-846, however, it is not promulgated at this time. The method states that the recovery of analytes from the matrix using this method has not been determined. It also does not give any direct guidance regarding the allotted time between thawing the sample and analysis. Due to the nature of the constituents analyzed in a VOC sample, headspace within the vial and the lack of preservative in the matrix, this time period should be kept as short as possible.

4.2 Technicium-99

No qualification of the data was required with regard to holding time criteria for technicium-99.

4.3 Total Uranium

No qualification of the data was required with regard to holding time criteria for total uranium.

5.0 Blank Contamination

5.1 VOCs

The trip blank, field blank, and equipment blank samples were only used to qualify the water samples due to matrix and analytical methodology differences between soil and groundwater samples.

The following qualifications were made due to method blank contamination in the water matrix:

Sample	Lab ID	Collection Date	Compound	Qualified Value
Equipment Blank	S21211202	12/11/02	Acetone	6.41 U ug/L
Trip Blank	S21212201	12/12/02	Acetone	19.1 U ug/L
Trip Blank	S21213201	12/13/02	Acetone	19.8 U ug/L
Sample Pump	S21213202	12/13/02	Acetone	20.9 U ug/L
Equipment Blank	S21212239	12/12/02	Acetone	19.5 U ug/L
BH3C Piz (6'-11')	S21216221	12/16/02	Acetone	6.77 U ug/L
BH4B Piz (7'-12')	S21216224	12/16/02	Acetone	5.00 U ug/L
Trip Blank	S21218202	12/18/02	Acetone	9.71 U ug/L
BH5D (5'-11')	S21217232	12/17/02	Acetone	5.00 U ug/L
Trip Blank	S21220201	12/19/02	Acetone	14.2 U ug/L
BH2B Piz (4'-9')	S21219219	12/19/02	Acetone	5.00 U ug/L
BH7B Piz (6'-11')	S21219217	12/19/02	Acetone	7.48 U ug/L
BH2B Piz (4'-9')	S21219219	12/19/02	Toluene	1.42 U ug/L

None of the method blank contamination noted in the soil matrix was detected in the associated soil samples. No qualification was required in soil samples due to method blank contamination.

5.2 Technicium-99

All method blank results were non-detect for technicium-99 and no qualification of the data was necessary.

5.3 Total Uranium

All method blank results were non-detect for total uranium and no qualification of the data was necessary.

6.0 Laboratory Control Samples (LCS)

6.1 VOCs

All VOC LCS results reported were within the laboratory established control limits for both soil and water matrices. A LCS was analyzed with each batch of samples. No qualification of the data was required based on the LCS recovery and LCS/LCSD relative percent difference (RPD) results reported in association with the RMI Groundwater Site Investigation samples.

6.2 Technicium-99

The LCS results for Technicium-99 were within the laboratory control limits. No qualification of the data was required based on the LCS recovery and LCS/LCSD RPD results reported in association with the RMI Groundwater Site Investigation samples.

6.3 Total Uranium

The LCS results for Total Uranium could not be recalculated by the reviewer. SHARP cannot evaluate the data with regard to the LCS results for Total Uranium.

7.0 Matrix Spike/Matrix Spike Duplicate Samples

7.1 VOC

Very few soil samples were reported for VOC MS/MSD analysis considering that the one hundred and eight soil samples were submitted for VOC analysis. The MS/MSDs reported did meet the laboratory established criteria and no qualification was necessary.

The MS/MSD for water matrices included spikes on equipment and field blanks as well as site-related samples. The MS/MSD results for the water matrices did meet the laboratory established criteria and no qualification of the data was necessary.

7.2 Technicium-99

The MS/MSD results for Technicium-99 were within the laboratory established control limit. No qualification of the data was required based on the sample accuracy evaluation.

7.3 Total Uranium

The MS/MSD results for total uranium were unable to be recalculated by the reviewer. SHARP cannot evaluate the total uranium data with regard to matrix effect on the sample analysis.

8.0 Surrogate Recoveries for VOCs

The surrogate recoveries for all samples were within acceptance criteria with the exception of the following:

Sample	Surrogate	% Recovery	Qualification
BH6D (10.5')	Bromofluoromethane	High	J all positive results
BH6C (8.5')	Bromofluoromethane	High	J all positive results
BH6B (9')	Bromofluoromethane	High	J all positive results
	Toluene-d ₈	High	
BH6A (12.5')	Bromofluoromethane	High	J all positive results
BH6A (12.5')V-1	Bromofluoromethane	High	J all positive results
BH3E (12')	Bromofluoromethane	High	J all positive results
BH4C (15')	Bromofluoromethane	High	J all positive results
BH3D (9')	Bromofluoromethane	High	J all positive results
BH3D (16')	Bromofluoromethane	High	J all positive results
BH3C (18')	Bromofluoromethane	High	J all positive results
BH8D (6.5')	Bromofluoromethane	High	J all positive results
BH9C (16')	Bromofluoromethane	High	J all positive results

9.0 Other

The problems with the holding time criteria for the soil samples for VOCs overshadowed any qualifications due to surrogates and the data was reported as unusable (R).

The concentration of some site-related constituents required the sample to be reanalyzed. These samples were reported at a dilution. The laboratory took the three ENCORE® soil samples received and preserved one with water for freezing, one in methanol for high concentration analysis if needed, and the third was used for moisture. The amount of sample remaining after the moisture aliquot was taken was also placed in water for freezing. This is how some samples were reanalyzed at an "apparent" dilution. For samples that were diluted due to compounds that exceeded the calibration range in original analysis, the diluted value was reported for only that compound. If a compound in the diluted analysis was detected at a significantly different concentration and above the reporting limit, the diluted result was reported. The compounds that were detected and selected for reporting in all samples that were diluted are given in the attached Tables 1-13.

For several samples, toluene was reported in the diluted analysis with a detected concentration, but was reported as non-detect in the original analysis. In these cases, the detected concentration for toluene was selected for use in the site evaluation.

It has been noted in several places that the quality control data reported for total uranium could not be calculated by the reviewer. Since SHARP cannot evaluate the data, no qualification can be made.

10.0 Summary and Conclusion

The data reported by General Engineering Laboratories for the RMI Groundwater Site was evaluated using the guidelines presented in the analytical method or the USEPA's National Functional Guidelines for Data Review.

The quality control data for Technitium-99 and Total Uranium did not correlate with spike recoveries and relative percent differences for duplicate analyses could not be reproduced by the reviewer based on the report submitted. Because of this, the data were not qualified based on the information submitted in the laboratory data reports.

Samples collected from both soils and groundwater at the site were qualified based on blank contamination in field and laboratory blank samples. Site-related samples with detected concentrations of constituents within 5 times the concentration detected in the associated blank sample were qualified as non-detect ("U" qualifier added) based on likely laboratory or field artifacts. Site-related samples with detected concentrations of constituents greater than 5 times the concentration detected in the associated blank sample were qualified as estimated ("J" qualifier added) based on likely laboratory or field contamination.

37% of the VOC data in soils has been qualified as unusable ("R" qualifier added) due to exceedance of more than two-time the holding time criteria (96 hours) from sample collection to analysis required when using ENCORE® samplers minus the time the sample was frozen. These data should be considered to be of screening quality; results reported as non-detected should not be used to assess the presence or absence of constituents at the site; results with detected concentrations should be considered to be bias low.

27% of the VOC data in soils has been qualified as estimated in both positive and non-detect results ("J" qualifier added) due to severely missed hold-time exceedances that did not reach the criterion used for data rejection (i.e., the samples were preserved and analyzed within the 96 hours from collection).

36% of the VOC data in soils were preserved within the acceptable hold time criteria of 48 hours from time of collection. These results were reported without further qualification.

Table 1

Original Sample vs. Diluted Sample Detected Results Comparison for BH1A at a Depth of 6.5 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH1A	6.5	S21210215	12/10/02	Toluene	< 4.95	U	156		UG/KG
BH1A	6.5	S21210215	12/10/02	Xylenes (total)	3.66	U	< 124	U	UG/KG
BH1A	6.5	S21210215	12/10/02	1,1-Dichloroethylene	34.4		< 124	U	UG/KG
BH1A	6.5	S21210215	12/10/02	1,1,2-Trichloroethane	4.84	U	< 124	U	UG/KG
BH1A	6.5	S21210215	12/10/02	Trichloroethylene	5550	E	4200		UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 2

Original Sample vs. Diluted Sample Detected Results Comparison for BH1B at a Depth of 3.1 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH1B	3.1	S21210203	12/10/02	Toluene	0.644 J		< 6.17 J		UG/KG
BH1B	3.1	S21210203	12/10/02	Xylenes (total)	1.26 J		10.7 J		UG/KG
BH1B	3.1	S21210203	12/10/02	1,2-Dichloroethylene (total)	9.51 J		6.86 J		UG/KG
BH1B	3.1	S21210203	12/10/02	Acetone	226 J		318 J		UG/KG
BH1B	3.1	S21210203	12/10/02	Vinyl chloride	1.23 J		< 6.17 J		UG/KG
BH1B	3.1	S21210203	12/10/02	1,1-Dichloroethylene	0.842 J		3.50 J		UG/KG
BH1B	3.1	S21210203	12/10/02	2-Butanone	615 EJ		610 J		UG/KG
BH1B	3.1	S21210203	12/10/02	Trichloroethylene	27.2 J		20.5 J		UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 3

Original Sample vs. Diluted Sample Detected Results Comparison for BH1B at a Depth of 7.5 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH1B	7.5	S21210205	12/10/02	Xylenes (total)	< 1.01	J	4.53	J	UG/KG
BH1B	7.5	S21210205	12/10/02	1,2-Dichloroethylene (total)	0.964	J	< 6.08	J	UG/KG
BH1B	7.5	S21210205	12/10/02	Acetone	145	J	213	J	UG/KG
BH1B	7.5	S21210205	12/10/02	Carbon disulfide	3.48	J	< 30.4	J	UG/KG
BH1B	7.5	S21210205	12/10/02	1,1-Dichloroethylene	< 1.01	J	8.59	J	UG/KG
BH1B	7.5	S21210205	12/10/02	2-Butanone	1920	EJ	2960	J	UG/KG
BH1B	7.5	S21210205	12/10/02	1,1,2-Trichloroethane	1.12	J	< 6.08	J	UG/KG
BH1B	7.5	S21210205	12/10/02	Trichloroethylene	252	EJ	438	J	UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 4

Original Sample vs. Diluted Sample Detected Results Comparison for BH1B at a Depth of 10.3 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH1B	10.3	S21210207	12/10/02	Xylenes (total)	< 0.866	J	4.72	J	UG/KG
BH1B	10.3	S21210207	12/10/02	Acetone	141	J	143	J	UG/KG
BH1B	10.3	S21210207	12/10/02	Carbon disulfide	10.1	J	31.7	J	UG/KG
BH1B	10.3	S21210207	12/10/02	1,1-Dichloroethylene	0.964	J	5.43	J	UG/KG
BH1B	10.3	S21210207	12/10/02	2-Butanone	1710	EJ	1770	J	UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 5
Original Sample vs. Diluted Sample Result Comparison for BH2B Pizeometer

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH2B	PIZ 4-9	S21219219	12/19/02	Toluene	1.42		1.63	J	UG/L
BH2B	PIZ 4-9	S21219219	12/19/02	cis-1,2-Dichloroethylene	1.39		1.64	J	UG/L
BH2B	PIZ 4-9	S21219219	12/19/02	1,2-Dichloroethylene (total)	1.39		1.64	J	UG/L
BH2B	PIZ 4-9	S21219219	12/19/02	Acetone	< 5.00		< 10.00		UG/L
BH2B	PIZ 4-9	S21219219	12/19/02	1,1,2-Trichloroethane	1.17		1.13	J	UG/L
BH2B	PIZ 4-9	S21219219	12/19/02	Trichloroethylene	128	E	130		UG/L

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 6
Original Sample vs. Diluted Sample Detected Results Comparison for BH2B at a Depth of 6.5 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH2B	6.5	S21212223	12/12/02	Tetrachloroethylene	95.7	R	119	R	UG/KG
BH2B	6.5	S21212223	12/12/02	1,2-Dichloroethylene (total)	3.76	R	2.98	R	UG/KG
BH2B	6.5	S21212223	12/12/02	Methylene chloride	< 6.93	R	7.56	R	UG/KG
BH2B	6.5	S21212223	12/12/02	1,1-Dichloroethylene	1.08	R	14.3	R	UG/KG
BH2B	6.5	S21212223	12/12/02	1,1,2-Trichloroethane	0.885	R	< 5.27	R	UG/KG
BH2B	6.5	S21212223	12/12/02	Trichloroethylene	239	ER	212	R	UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 7

Original Sample vs. Diluted Sample Result Comparison for BH5D at a Depth of 7.0 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Original Sample			Diluted		
					Value	Flag1	Units	Value	Flag1	Units
BH5D	7	S21217204	12/17/02	Toluene	< 1.26 J		UG/KG	154 J		UG/KG
BH5D	7	S21217204	12/17/02	Tetrachloroethylene	540 EJ		UG/KG	840 J		UG/KG
BH5D	7	S21217204	12/17/02	1,2-Dichloroethylene (total)	6.22 J		UG/KG	< 140 J		UG/KG
BH5D	7	S21217204	12/17/02	1,1,1-Trichloroethane	2.41 J		UG/KG	< 140 J		UG/KG
BH5D	7	S21217204	12/17/02	Methylene chloride	5.67 J		UG/KG	< 700 J		UG/KG
BH5D	7	S21217204	12/17/02	1,1-Dichloroethylene	3.22 J		UG/KG	< 140 J		UG/KG
BH5D	7	S21217204	12/17/02	Trichloroethylene	56.9 J		UG/KG	< 140 J		UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 8

Original Sample vs. Diluted Sample Detected Results Comparison for BH5E at a Depth of 7.5 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH5E	7.5	S21217213	12/17/02	Toluene	< 0.995 J		129 J		UG/KG
BH5E	7.5	S21217213	12/17/02	1,2-Dichloroethylene (total)	18.0 J		< 116 J		UG/KG
BH5E	7.5	S21217213	12/17/02	Vinyl chloride	1.19 J		< 116 J		UG/KG
BH5E	7.5	S21217213	12/17/02	Methylene chloride	2.70 J		< 582 J		UG/KG
BH5E	7.5	S21217213	12/17/02	1,1-Dichloroethane	0.542 J		< 116 J		UG/KG
BH5E	7.5	S21217213	12/17/02	1,1-Dichloroethylene	2.01 J		< 116 J		UG/KG
BH5E	7.5	S21217213	12/17/02	Trichloroethylene	340 EJ		739 J		UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 9
Original Sample vs. Diluted Sample Detected Results Comparison for BH5F at a Depth of 6.0 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH5F	6	S21217217	12/17/02	Toluene	< 1.21 J		201 J		UG/KG
BH5F	6	S21217217	12/17/02	Tetrachloroethylene	330 EJ		376 J		UG/KG
BH5F	6	S21217217	12/17/02	1,2-Dichloroethylene (total)	34.3 J		< 143 J		UG/KG
BH5F	6	S21217217	12/17/02	Acetone	9.38 J		551 J		UG/KG
BH5F	6	S21217217	12/17/02	1,1,1-Trichloroethane	1.33 J		< 143 J		UG/KG
BH5F	6	S21217217	12/17/02	Vinyl chloride	4.23 J		< 143 J		UG/KG
BH5F	6	S21217217	12/17/02	Methylene chloride	4.27 J		< 713 J		UG/KG
BH5F	6	S21217217	12/17/02	1,1-Dichloroethylene	1.25 J		< 143 J		UG/KG
BH5F	6	S21217217	12/17/02	Trichloroethylene	210 EJ		170 J		UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 10
Original Sample vs. Diluted Sample Detected Results Comparison for BH7D at a Depth of 7.5 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH7D	7.5	S21218233	12/18/02	Xylenes (total)	0.884	R	4.37	R	UG/KG
BH7D	7.5	S21218233	12/18/02	1,2-Dichloroethylene (total)	30.9	R	< 6.00	R	UG/KG
BH7D	7.5	S21218233	12/18/02	Acetone	33.7	R	47.0	R	UG/KG
BH7D	7.5	S21218233	12/18/02	Methylene chloride	3.36	R	18.8	R	UG/KG
BH7D	7.5	S21218233	12/18/02	1,1-Dichloroethylene	8.76	R	11.6	R	UG/KG
BH7D	7.5	S21218233	12/18/02	2-Butanone	4.97	R	< 30.0	R	UG/KG
BH7D	7.5	S21218233	12/18/02	Trichloroethylene	1.18	R	< 6.00	R	UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 11

Original Sample vs. Diluted Sample Detected Results Comparison for BH8B at a Depth of 2.0 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH8B	2	S21218219	12/18/02	Toluene	0.377	J	< 5.91		UG/KG
BH8B	2	S21218219	12/18/02	Acetone	33.8		94.2		UG/KG
BH8B	2	S21218219	12/18/02	Methylene chloride	2.53	J	17.7	J	UG/KG
BH8B	2	S21218219	12/18/02	1,1-Dichloroethylene	8.28		6.13		UG/KG
BH8B	2	S21218219	12/18/02	2-Butanone	6.51		27.3		UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 12
Original Sample vs. Diluted Sample Detected Results Comparison for BH8D at a Depth of 6.5 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH8D	6.5	S21218214	12/18/02	Acetone	8.10		19.8	J	UG/KG
BH8D	6.5	S21218214	12/18/02	Methylene chloride	2.24	J	17.7	J	UG/KG
BH8D	6.5	S21218214	12/18/02	1,1-Dichloroethylene	1.05		4.65	J	UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data

Table 13
Original Sample vs. Diluted Sample Detected Results Comparison for BH9C at a Depth of 16.0 ft.

Borehole	Depth (ft.)	Lab Number	Date	Chemical	Value	Flag1	Diluted Value	Flag1	Units
BH9C	16	S21217230	12/17/02	Toluene	0.297	J	< 5.14	J	UG/KG
BH9C	16	S21217230	12/17/02	Xylenes (total)	1.08	J	4.06	J	UG/KG
BH9C	16	S21217230	12/17/02	Acetone	9.23	J	< 25.7	J	UG/KG
BH9C	16	S21217230	12/17/02	Methylene chloride	3.06	J	16.0	J	UG/KG
BH9C	16	S21217230	12/17/02	1,1-Dichloroethylene	1.92	J	4.70	J	UG/KG

Highlighted results were reported.

J - Estimated value

E - Sample results exceed calibration range

R - Rejected data